Sales Variance Analysis — Theory & Formulas

⚖️ Purpose

Sales variance analysis explains the differences between actual and budgeted performance caused by:

1. Changes in sales prices
2. Changes in sales volume
3. Changes in variable cost per unit
4. Changes in product mix (proportion of each product sold)

Sales variances differ from manufacturing variances (which focus on production inputs).

🧾 Income Statement Basis

- Based on **variable costing**: only variable costs are deducted from sales to find contribution margin.
- Fixed costs are excluded from this variance analysis.
- This gives the **contribution margin**, which shows how much revenue is available to cover **fixed costs** and generate **profit**.
- Since **fixed costs remain constant** regardless of sales volume, they are **excluded** from this analysis to isolate the impact of **variable factors**.

- Contribution Margin = Sales Revenue − Variable Costs

- Fixed costs (e.g., rent, salaries) do **not fluctuate** with sales volume

📊 Types of Budgets Used

Budget Type	Description
Static Budget	Based on original expected sales volume and prices.
Flexible Budget	Adjusted for actual sales volume, using budgeted prices and costs.
Actual Results	Reflect real data (actual volume, price, and cost).

🔍 Key Variances Defined

Variance	Formula	Meaning
Static Budget Variance	Actual amount − Static Budget amount	Total difference between actual and planned performance

Variance	Formula	Meaning
Flexible Budget Variance	Actual amount − Flexible Budget amount	Difference due to change in price or cost per unit
Sales Volume Variance	Flexible Budget amount − Static Budget amount	Difference due to change in quantity sold

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⚙️ **Relationships Between Variances**

Static Budget Variance Flexible Budget Variance + Sales Volume Variance

Sales Volume Variance Static Budget Variance — Flexible Budget Variance

🧠 **Summary**

Variance Type	Caused by
Price Variance	Change in selling price
Volume Variance	Change in quantity sold
Cost Variance	Change in variable cost per unit
Mix Variance	Change in product mix or combination

📘 **Selling Price (Sales Price) Variance**

💡 **Definition**

Measures how much of the difference between actual and budgeted revenue is caused by a change in the selling price per unit.

📜 **Formula**

Selling Price Variance = (Actual Selling Price — Budgeted Selling Price) x Actual Quantity Sold

📊 **Interpretation**

Condition	Result	Meaning
Actual SP > Budgeted SP	Favorable (F)	Sold at higher price
Actual SP < Budgeted SP	Unfavorable (U)	Sold at lower price

🧩 **Link to Sales Variance Report**

Variance Type	Formula	Meaning
Flexible Budget Variance	Actual − Flexible Budget	Price or cost difference
Sales Volume Variance	Flexible Budget − Static Budget	Quantity difference
Static Budget Variance	Actual − Static Budget	Overall difference

For Revenue Line:

Flexible Budget Variance = Selling Price Variance

Flexible Budget Variances (Single-Product Company)

💡 **Formula**

Flexible Budget Variance (Actual Price (AP) — Standard Price (SP)) x Actual Quantity (AQ)

🧩 **Symbol Meaning**

Symbol	Meaning
AP	Actual price (revenue or cost) per unit
SP	Standard (budgeted) price or cost per unit
AQ	Actual quantity sold

⚖️ **Interpretation**

Line Type	Positive Variance	Negative Variance
Revenue	Favorable (F)	Unfavorable (U)
Cost	Unfavorable (U)	Favorable (F)

📘 **Comparison**

Similar to **Direct Materials Price Variance Formula:**

$$(AP-SP)\times AQ$$

⚠️ **Key Distinctions**

- Manufacturing variances = based on **units produced**
- Sales variances = based on **units sold**
- Fixed costs have **no** sales volume or flexible budget variance.

✅ **Summary Table**

Item	Formula	Favorable If	Type
Selling Price Variance	(AP – SP) × AQ	AP > SP	Revenue
Variable Cost Variance	(AP – SP) × AQ	AP < SP	Cost
Total Flexible Budget Variance	Actual – Flexible Budget	Depends	All Lines

📘 Sales Volume Variance (Single-Product Company)

💡 Definition

Measures the effect of selling more or fewer units than budgeted on revenue, costs, or contribution margin.

⚙️ Formula

Sales Volume Variance=(Actual Quantity Sold (AQ)−Budgeted Quantity Sold (SQ))×Standard Price or C ost (SP)

🔹 For Different Lines

Line	SP refers to
Revenue	Budgeted Selling Price per unit
Variable Cost	Budgeted Variable Cost per unit
Contribution Margin	Budgeted CM per unit = (Budgeted Price − Budgeted Variable Cost)

Alternative Formulas

Sales Volume Variance = Flexible Budget Amount — Static Budget Amount

or

Sales Volume Variance = Static Budget Variance — Flexible Budget Variance

Key Relationship

Flexible Budget Variance + Sales Volume Variance Static Budget Variance

🧱 Special Notes

- Fixed costs → No Sales Volume Variance
- If only flexible budget is given → Sales Volume Variance = 0

  If only the flexible budget is available:

here's **no baseline quantity** to compare against.

So, **Sales Volume Variance = 0** by default.

- For revenue: negative variance = **Unfavorable**
- For costs: negative variance = **Favorable**

🧠 Summary Table

Line Item	Formula	Favorable If	Type
Revenue	(AQ − SQ) × SP	AQ > SQ	F
Variable Cost	(AQ − SQ) × SP	AQ < SQ	F
Contribution Margin	(AQ − SQ) × CM/unit	AQ > SQ	F
Fixed Cost	Always 0	—	—

📘 Sales Variances — Multiple-Product Company

🔹 Flexible Budget (Selling Price) Variance

Flexible Budget Variance (Revenue)=∑(AP−SP)×AQ

Where:
AP = Actual Price per unit
SP = Budgeted (Standard) Price per unit
AQ = Actual Quantity Sold

Relationship:

Static Budget Variance=Flexible Budget Variance+Sales Volume Variance

Actual Price > Budgeted Price	**Favorable (F)**	Products were sold at higher prices than planned → more revenue earned
Actual Price < Budgeted Price	**Unfavorable (U)**	Products were sold at lower prices than planned → less revenue earned

🔹 Sales Volume Variance (Multiple-Product)

Sales Volume Variance=∑(AQ−SQ)×SP

- AQ > SQ → Favorable
- AQ < SQ → Unfavorable

Relationship:

Static Budget Variance=Selling Price Variance + Sales Volume Variance

🔹 Sales Quantity & Mix Variances

Total Sales Volume Variance is divided into:

Sales Volume Variance=Sales Quantity Variance + Sales Mix Variance

1️⃣ Sales Quantity Variance

Sales Quantity Variance=$\sum (AQ_{SM} - SQ) \times SP$

- Measures variance due to total quantity difference using standard (budgeted) mix proportions.

2️⃣ Sales Mix Variance

Sales Mix Variance=$\sum (AQ - AQ_{SM}) \times SP$

- Measures variance due to a change in the proportions of products sold.

Where:
AQ_{SM} = Actual Quantity at Standard Mix.

🧠 Key Exam Relationships

Concept	Formula
Static Budget Variance	= Selling Price Variance + Sales Volume Variance
Sales Volume Variance	= Sales Quantity Variance + Sales Mix Variance

📘 Sales Mix Variance (Weighted-Average Method)

💡 Formula

Sales Mix Variance=$(WASP_{AM} - WASP_{SM}) \times$Total Actual Quantity (AQ)

Where:

- $WASP_{SM}$ = Weighted Average Standard Price for Standard Mix
- $WASP_{AM}$ = Weighted Average Standard Price for Actual Mix

🔹 Interpretation

- If more low-priced products are sold → **Unfavorable** variance
- If more high-priced products are sold → **Favorable** variance

" Sales Mix Variance=$\sum(AQ-AQ_{SM})\times SP$" and "Sales Mix Variance = $(WASP_{AM}- WASP_{SM})\times$Total Actual Quantity (AQ)" both give the same result

✅ **Total Sales Variance Summary (Multiple-Product Company)**

Hierarchy of Variances

Static Budget Variance = Selling Price Variance + Sales Volume Variance

Sales Volume Variance Sales Quantity Variance + Sales Mix Variance

💡 **Favorable/Unfavorable Rules**

Line Type	**Positive Variance**	**Negative Variance**
Revenue / Contribution Margin	Favorable	Unfavorable
Variable Cost	Unfavorable	Favorable

- Comprehensive Example Question — Sales Variance Analysis (A to Z)

Question

ABC Ltd. produces and sells two products: **Product X** and **Product Y**.
The company has prepared the following **budgeted** and **actual** sales data for the month of October:

Particulars	**Product X**	**Product Y**
Budgeted Selling Price per unit (SP)	₹50	₹40
Budgeted Sales Quantity (units)	1,000	1,500
Actual Selling Price per unit (AP)	₹55	₹35
Actual Sales Quantity (units)	1,200	1,300

A. Required: Calculate the following variances step-by-step

1. **Selling Price Variance** for each product and total.
2. **Sales Volume Variance** for each product and total.
3. **Sales Quantity Variance** and **Sales Mix Variance** for each product and total.
4. **Static Budget Variance** and verify relationships among all variances.
5. **Interpret** each result as **Favorable (F)** or **Unfavorable (U)**.

B. Formulas to Use

Variance	Formula
Selling Price Variance	(AP − SP) × AQ
Sales Volume Variance	(AQ − SQ) × SP
Sales Quantity Variance	(AQ at Standard Mix − SQ) × SP
Sales Mix Variance	(AQ − AQ at Standard Mix) × SP
Relationship 1	Static Budget Variance = Selling Price Variance + Sales Volume Variance
Relationship 2	Sales Volume Variance = Sales Quantity Variance + Sales Mix Variance

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C. Step 1: Static and Flexible Budget Setup

Product	SP (₹)	SQ	AQ	AP (₹)
X	50	1,000	1,200	55
Y	40	1,500	1,300	35

Static Budget Revenue
= (1,000 × 50) + (1,500 × 40) = ₹50,000 + ₹60,000 = ₹1,10,000

Flexible Budget Revenue (based on actual units × budgeted price)
= (1,200 × 50) + (1,300 × 40) = ₹60,000 + ₹52,000 = ₹1,12,000

Actual Revenue
= (1,200 × 55) + (1,300 × 35) = ₹66,000 + ₹45,500 = ₹1,11,500

D. Step 2: Selling Price Variance

Selling Price Variance=(AP−SP)×AQ

Product	Formula	Variance (₹)	Result
X	(55 − 50) × 1,200 = 5 × 1,200	6,000	Favorable
Y	(35 − 40) × 1,300 = (−5) × 1,300	−6,500	Unfavorable

Total Selling Price Variance = ₹6,000 − ₹6,500 = ₹(500) U

E. Step 3: Sales Volume Variance

Sales Volume Variance=(AQ−SQ)×SP

Product	Formula	Variance (₹)	Result
X	(1,200 − 1,000) × 50	10,000	Favorable
Y	(1,300 − 1,500) × 40	−8,000	Unfavorable

Total Sales Volume Variance = ₹10,000 − ₹8,000 = ₹2,000 F

F. Step 4: Sales Quantity and Mix Variances

Step 4.1: Determine Actual Total Quantity

Actual total quantity (AQ total) = 1,200 + 1,300 = **2,500 units**

Step 4.2: Standard Mix Ratio

Total budgeted units = 1,000 + 1,500 = **2,500 units**
Standard mix of X = 1,000 / 2,500 = **40%**
Standard mix of Y = 1,500 / 2,500 = **60%**

Step 4.3: Calculate AQ at Standard Mix

Product	Standard Mix %	AQ total (2,500)	AQ at Standard Mix
X	40%	2,500	1,000
Y	60%	2,500	1,500

Step 4.4: Sales Quantity Variance

Sales Quantity Variance=(AQSM−SQ)×SP

Product	Formula	Variance (₹)	Result
X	(1,000 − 1,000) × 50	0	—
Y	(1,500 − 1,500) × 40	0	—

Total Sales Quantity Variance = ₹0

Step 4.5: Sales Mix Variance

Sales Mix Variance=(AQ−AQSM)×SP

Product	Formula	Variance (₹)	Result
X	(1,200 − 1,000) × 50	10,000	F
Y	(1,300 − 1,500) × 40	−8,000	U

Total Sales Mix Variance = ₹2,000 F

G. Step 5: Relationship Verification

Check	Formula	Result
Sales Volume Variance	= Sales Quantity + Sales Mix	0 + 2,000 F = ✅ 2,000 F
Static Budget Variance	= Selling Price + Sales Volume	(−500 U) + (2,000 F) = ✅ 1,500 F

H. Step 6: Final Summary Table

Variance Type	X (₹)	Y (₹)	Total (₹)	Result
Selling Price Variance	6,000 F	6,500 U	500 U	Overall unfavorable
Sales Volume Variance	10,000 F	8,000 U	2,000 F	Overall favorable
Sales Quantity Variance	0	0	0	—
Sales Mix Variance	10,000 F	8,000 U	2,000 F	Favorable
Static Budget Variance (Total)	—	—	**1,500 F**	**Overall Favorable**

I. Step 7: Interpretation Summary

- **Selling Price Variance (₹500 U)** → Price decrease in Product Y caused slight loss overall.
- **Sales Volume Variance (₹2,000 F)** → Sold more total units → increased revenue.
- **Sales Mix Variance (₹2,000 F)** → More of Product X (high-priced item) sold → favorable.
- **Overall Static Budget Variance = ₹1,500 F** → Actual sales performance was **slightly better** than planned.

Using Another Method or Formula :-

Sales Mix Variance=$(WASP_{AM} - WASP_{SM}) \times$Total Actual Quantity (AQ)

Where:

Symbol	Meaning
$WASP_{AM}$	Weighted Average Standard Price for **Actual Mix**
$WASP_{SM}$	Weighted Average Standard Price for **Standard Mix**
AQ	Total Actual Quantity Sold (sum of all products)

📘 **Example — Using the Same ABC Ltd. Data**

Product	SP (₹)	AQ	SQ
X	50	1,200	1,000
Y	40	1,300	1,500

Total AQ = 1,200 + 1,300 = **2,500 units**
Total SQ = 1,000 + 1,500 = **2,500 units**

STEP 1 – Find Standard Mix Ratio

Product	SQ	Standard Mix %
X	1,000	1,000 / 2,500 = 0.40 (40%)
Y	1,500	1,500 / 2,500 = 0.60 (60%)

STEP 2 – Find Actual Mix Ratio

Product	AQ	Actual Mix %
X	1,200	1,200 / 2,500 = 0.48 (48%)
Y	1,300	1,300 / 2,500 = 0.52 (52%)

STEP 3 – Compute Weighted Average Standard Price (WASP)

a) WASP for Standard Mix ($WASP_{sm}$):

$WASP_{SM}$ = (0.40×50) + (0.60×40) =₹44

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b) WASP for Actual Mix ($WASP_{am}$):

$WASP_{AM}$=(0.48×50) + (0.52×40) =₹44.8

STEP 4 – Apply the Formula

sales Mix Variance = ($WASP_{AM}$ — $WASP_{sM}$) x Total AQ

= (44.8 — 44) x 2, 500

0.8 x 2, 500 {2, OOO Favorable

✅ **Interpretation**

- $WASP_{AM}$ > $WASP_{SM}$ → Actual mix included more high-priced products (Product X).

Therefore, variance is Favorable (₹2,000 F).

🧾 **Cross-Check with Earlier Method**

Earlier, using the detailed product-by-product formula:

(1,200−1,000)×50+(1,300−1,500)×40=10,000−8,000=₹2,000F

✅ **Same result.**

🧮 **Summary Table**

Step	Item	Formula	Result
1	$WASP_{sm}$	(0.4×50)+(0.6×40)	₹44
2	$WASP_{am}$	(0.48×50)+(0.52×40)	₹44.8
3	Sales Mix Variance	(44.8−44)×2,500	₹2,000 F

✅ **Final Answer:**

Sales Mix Variance = ₹2,000 Favorable

- ***WASP method to find Sales Quantity Variance***

Sales Volume Variance=Sales Quantity Variance+Sales Mix Variance

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1. Formula (WASP method)

Use the **standard (budgeted) weighted average selling price** (WASPSM_{SM}SM) to convert a total-units difference into a value:

Sales Quantity Variance = (Total Actual Quantity−Total Budgeted Quantity) × $WASP_{SM}$

Meaning: change in total units → multiplied by the price that would have applied if the standard mix had been sold.

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2. Apply to the ABC Ltd. data (from earlier)

Data recap:

- Total Actual Quantity === 1,200 (X) + 1,300 (Y) = **2,500**
- Total Budgeted Quantity === 1,000 (X) + 1,500 (Y) = **2,500**

We previously computed:

$WASP_{SM}$ = (0.40×50) + (0.60×40) = ₹44

Now compute quantity variance:

Sales Quantity Variance = (2,500−2,500) × 44=0×44=₹0

Interpretation: No effect from total quantity — actual total units = budgeted total units → quantity variance = 0.

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3. Cross-check the identity

We found earlier:

- Sales Mix Variance = **₹2,000 F** (WASP method)
- Sales Quantity Variance = **₹0**

So:

Sales Volume Variance=Sales Quantity Variance+Sales Mix Variance=0+2,000 F=2,000 F

This matches the Sales Volume Variance computed by the per-product method.

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4. If total actual and budgeted totals differ (quick template)

If totals differ, use:

1. Compute $WASP_{SM}$ from budgeted mix.
2. Compute ΔQ=Total AQ−Total SQ

- Sales Quantity Variance = $\Delta Q \times WASP_{SM}$
- If ΔQ>0 → Quantity variance is **Favorable** for revenue.
- If ΔQ<0 → **Unfavorable** for revenue.